PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-189946
(43)Date of publication of application : 23.07.1996

---

(51)Int.Cl.
G01R 31/00
G01R 31/02
G01R 31/28

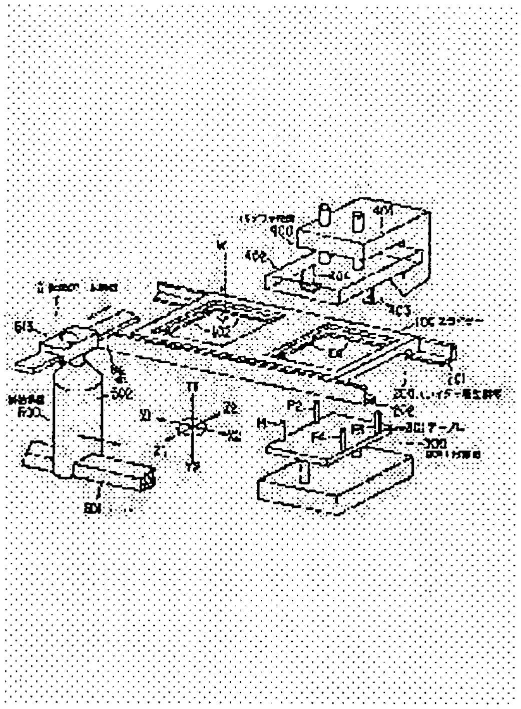
---

(21)Application number : 07-002534
(22)Date of filing : 11.01.1995
(71)Applicant : TOKYO ELECTRON IND CO LTD
(72)Inventor : IWATA TOSHIAKI

---

(54) ELECTRONIC BOARD BODY INSPECTING DEVICE

(57)Abstract:



PURPOSE: To provide a small-sized easily-controllable electronic board body inspecting device which can remarkably improve the workability and shorten the working time and a method for inspecting electronic board bodies by using the device.
CONSTITUTION: First and second mounted sections 101 and 102 are provided on a slider 100 at an interval in the sliding direction of the slider 100 so that the second section 102 can be positioned to an inspecting position when the first section 101 is positioned to a first supplying position by driving the slider 100 by means of a slider driving means and the first section 101 can be positioned to the inspecting position when the second section 102 is positioned to a second supplying position. Thus the slider 100 is constituted so that an inspected electronic plate body mounted on the first or second section 101 or 102 can be exchanged with an electronic board body to be inspected next while the electronic board plate mounted on the section 102 or 102 is inspected at the inspecting position.

LEGAL STATUS
[Date of request for examination] 06.11.2001

[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	3375223
[Date of registration]	29.11.2002
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

Copyright (C); 1998,2003 Japan Patent Office

* NOTICES *

`Japan Patent Office is not responsible for any damages caused by the use of this translation.`

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In the condition that you made it located in the 1st supply location, said 1st carried section of the slider which sets spacing in the slide direction and has the 1st and 2nd carried section, and said slider Where it located said 2nd carried section in the inspection location and said 2nd carried section is located in the 2nd supply location A slider drive means to locate said 1st carried section in said inspection location, In the upper part of said inspection location, an inspection probe Electronic board test equipment characterized by providing the exchange style which exchanges the electronic board [finishing / inspection] carried in said 1st [the] which moved to the test equipment [which was arranged], said 1st, and 2nd supply locations, and said 2nd carried section for the electronic board to be inspected from now on.

[Claim 2] The 1st and the 2nd pressure-from-below device which said exchange style is arranged by the lower part of the said 1st and 2nd supply location, respectively, and the electronic board carried in the 1st [of said slider] and 2nd carried section can be thrust up up, and can be surfaced, The 1st and the 2nd buffer style which are arranged in the upper part of the said 1st and 2nd supply location, respectively, and can receive the electronic board which has surfaced according to the said 1st and 2nd pressure-from-below device in each location, Electronic board test equipment according to claim 1 which supplies a new electronic board to the said 1st [which became empty], and 2nd carried section, and is characterized by providing the supply device which takes out the electronic board held by the said 1st and 2nd buffer style.

[Claim 3] Electronic board test equipment according to claim 1 characterized by establishing the attitude control device in which lift the electronic board which has moved to this inspection location from the lower part in the lower part of said inspection location, and an inclination and position control are performed.

[Claim 4] Said supply device is electronic board test equipment according to claim 2 which the number of is one and is characterized by the ability to move to said 1st and 2nd supply location freely.

[Claim 5] Set spacing in the slide direction of a slider, prepare the 1st and 2nd carried section, and said slider is driven with a slider drive means. In the condition that you made it located in the 1st supply location, said 1st carried section Where it located said 2nd carried section in the inspection location and said 2nd carried section is located in the 2nd supply location The electronic board inspection approach characterized by exchanging the inspected electronic board of the 1st carried section or the 2nd carried section for the electronic board to be inspected from now on while locating said 1st carried section in said inspection location and inspecting the electronic board of said said inspection location.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the electronic board test equipment which carries out suitable [of the electronic boards, such as a liquid crystal plate and an electronic part article substrate,] to inspecting with sufficient working efficiency.
[0002]
[Description of the Prior Art] For example, after manufacturing a liquid crystal plate, the contact probe is inspected in contact with the terminal electrode. Conventional test equipment for this incorporated and carried out the liquid crystal plate which inspection ended, after conveying and installing the liquid crystal plate of non-checking in the inspection location, then conducting inspection predetermined in this inspection location and inspection finishing, next the process of conveying and installing the new liquid crystal plate for inspected in an inspection location is taken. Although this process is performed by the robot, the whole working hours are long and much more improvement is desired. Moreover, control of a robot is complicated in order to take a complicated process also about a robot.
[0003]
[Problem(s) to be Solved by the Invention] If it is in conventional electronic board test equipment as described above, improvement in the workability, compaction of working hours, the simplification of control and a miniaturization, and small tooth-space-ization are desired. Then, this invention realizes a miniaturization and also aims compaction and control of working hours at offering easy electronic board test equipment while it can improve workability markedly.
[0004]
[Means for Solving the Problem] In the condition that you made it located in the 1st supply location, said 1st carried section of the slider which this invention sets spacing in the slide direction, and has the 1st and 2nd carried section, and said slider Where it located said 2nd carried section in the inspection location and said 2nd carried section is located in the 2nd supply location A slider drive means to locate said 1st carried section in said inspection location, It has the exchange style which exchanges the electronic board [finishing / inspection] carried in said 1st [the] which moved to the test equipment which arranged the inspection probe in the upper part of said inspection location, and said 1st and 2nd supply locations, and said 2nd carried section for the electronic board to be inspected from now on.
[0005] By this invention, said exchange style is arranged by the lower part of the said 1st and 2nd supply location further again, respectively. The 1st of said slider, the 1st which the electronic board carried in the 2nd carried section can be thrust [1st] up up, and can surface it, and the 2nd pressure-from-below device, ~~The 1st and the 2nd buffer style~~ which are arranged in the upper part of the said 1st and 2nd supply location, respectively, and can receive the electronic board which has surfaced according to the said 1st and 2nd pressure-from-below device in each location, The electronic board held by the said 1st and 2nd buffer style is taken out, and it has said 1st [the] which became empty, and the supply device in which a new electronic board is supplied to the 2nd carried section.
[0006]

[Function] According to the above-mentioned means, an electronic board [finishing / inspection of the 2nd or 1st carried section] will be taken out by said pressure-from-below device and buffer style by the time amount which the electronic board of the 1st or 2nd carried section moves to said inspection location, and is inspected, a new electronic board will be supplied according to said supply device, almost all time amount turns into inspection time amount, and the whole working hours can be shortened.

[0007]

[Example] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 can show the outline in one example of this invention, and a slider 100 can move a rail 201 top to an illustration arrow-head X1-X 2-way freely with the slider drive 200. As a slider drive 200, a motor etc. is used, for example. A slider 100 has the 1st and 2nd carried section 101 and 102 in the slide direction. It is a rectangular-head-like frame, and has penetrated up and down, and the 1st and 2nd carried section 101 and 102 can carry an electronic board (liquid crystal glass plate) here with a pallet. The condition of drawing is in the condition of a slider 100 moving in the direction of the illustration arrow head X2, and having located the 1st carried section 101 in the 1st supply location, and having moved the 2nd carried section 102 to the inspection location.

[0008] Where the slider 100 moved to the arrow-head X 2-way, it located the 2nd carried section 102 in the inspection location where the 1st carried section 101 is located in the 1st supply location, and the 2nd carried section 102 is located in the 2nd supply location, the 1st carried section 101 is located in said inspection location (refer to drawing 2 (A)). If a slider 100 moves in the arrow-head X1 direction in drawing 2 (A), it will be in the condition of having located the 2nd carried section 102 in the 2nd supply location, and having located the 1st carried section 101 in said inspection location.

[0009] It returns and explains to drawing 1 . Here, the probe of test equipment (not shown) etc. is located in the upper part of an inspection location, and the attitude control device for stabilizing the posture of an electronic board into a desired inspection posture is also arranged by the lower part.

[0010] Here, in the state of drawing, the 1st pressure-from-below device 300 is arranged by the lower part of the 1st supply location, and the 1st buffer style 400 is arranged in the upper part. Although the 2nd same pressure-from-below device also as the lower part of the 2nd supply location is arranged similarly and the 2nd buffer style is arranged in the upper part, it is omitting by a diagram.

[0011] It explains from the lower pressure-from-below device 300. The pressure-from-below device 300 can thrust up from the bottom the liquid crystal glass plate carried in the 1st carried section 101, and can change it into a surfacing condition. Therefore, it has the table 301 by which vertical control is carried out, and the pins P1-P4 projected to two or more places of this table 301. If rise control of the table 301 is carried out, pins P1-P4 can let the notch currently formed so that it may cut deeply inside the 1st carried section 101 pass, and can push up the edge of the liquid crystal glass plate which has stopped on the inside edge of the 1st carried section 101. The condition that it was held by the pallet 111 in the 1st carried section 101 at drawing 2 (B) and (C), and the liquid crystal glass plate 500 was carried is shown. The notch corresponding to the previous pins P1-P4 is formed also in the pallet 111, and pins P1-P2 can insert now in the upper part from the lower part through this notch.

[0012] Drawing 3 shows the condition that pins P1-P4 surfaced the liquid crystal glass plate 500. In taking out the liquid crystal glass plate 500 from a slider 100, the liquid crystal glass plate 500 is surfaced like drawing 3 , next the 1st upside buffer style 400 receives this liquid crystal glass plate 500. namely, the buffer style 400 -- standing ways 401 and these standing ways 401 -- receiving -- the upper and lower sides -- being free (illustration arrow-head Y1-Y 2-way) -- it consists of an attached table 402 and arms 403 and 404 attached in this table 402. Arms 403 and 404 have a controllable point in the condition and the condition of having separated which are an L type and approached mutually, and can hold the edge section of the liquid crystal glass plate 500 with two arms 403 and 404. By being controlled in the direction where downward control of the table 402 of the buffer style 400 is carried out, and arms 403 and 404 close the tip after the liquid crystal glass plate 500 has surfaced, the liquid crystal glass plate 500 is received and it goes up. As the dashed line of illustration shows, after arms 403 and 404 have held the liquid crystal glass plate 500, the table 301 of the pressure-from-below device 300 descends.

[0013] The liquid crystal glass plate 500 which remained in the buffer style 403 is taken out by the supply device. Moreover, this supply device can carry a liquid crystal glass plate to the carried section of a slider 100.

[0014] As the supply device 600 is shown in drawing 1 , the body section 602 is carried on the rail 601 attached to the illustration arrow-head X1-X 2-way, and the revolving arm device 611 is constituted by the head of the body section 602. This revolving arm device 611 consists of rotation bases 613 which can be rotated freely superficially itself while holding the slide plate 612 and this slide plate 612 free [the slide to a longitudinal direction]. The adsorption section is prepared in the field of the slide plate 612 bottom, and a liquid crystal glass plate can be adsorbed with a vacuum adsorber, or it can be made to secede from it. This supply device 600 can carry out migration control of the above-mentioned revolving arm device 611 in the vertical direction further again.

[0015] The explanatory view of the above-mentioned supply device 600 of operation is shown in drawing 4 . By drawing 4 (a), extension control of the slide plate 612 is carried out in the arrow-head Z1 direction, and the condition of having adsorbed the liquid crystal glass plate 500 of the components supply section is shown. Thus, if the liquid crystal glass plate 500 is adsorbed and is held, the slide plate 612 will be drawn in an illustration arrow-head Z 2-way a little. Next, as shown in drawing 4 (b), (c), and (d), the function of the rotation base 613 is demonstrated, the sense is changed, and the liquid crystal glass plate 500 is turned to a slider 100 side. Next, you make it located in the upper part of the carried section of a request of the liquid crystal glass plate 500 by making the slide plate 612 extend in a slider 100 side. If the adsorption to the liquid crystal glass plate 500 is released here, the liquid crystal glass plate 500 will be arranged on the pallet of the carried section of a slider 100.

[0016] The explanation by above-mentioned drawing 4 explained the activity which lays the liquid crystal glass substrate which will inspect from now on in the carried section of a slider 100. On the contrary, the following activities are done, when taking out the liquid crystal glass plate which inspection finished and containing to a desired stowage.

[0017] That is, in the 1st supply location or the 2nd supply location, the liquid crystal glass plate which inspection finished is thrust up by the pressure-from-below device, and is held by the buffer style (it explained in drawing 3). The liquid crystal glass substrate in the condition of having been held by the buffer style is first adsorbed by the slide plate 612 of the empty of the supply device 600. Drawing 4 explained this adsorption activity. And the liquid crystal glass substrate taken out in order of (e) of drawing 4 , (d), (c), (b), and (a) will be contained to a stowage. Thus, also including migration in the 1st supply location explained by drawing 2 , and the 2nd supply location, it repeats the above-mentioned activity, and the supply device 600 is performed, and a checking liquid crystal glass plate is carried in the vacant carried section, and it takes out a liquid crystal glass plate [finishing / inspection].

[0018] Drawing 5 (A) shows the condition in case the slide plate 612 takes out the liquid crystal glass plate 500 from the buffer style 400. Moreover, the slide plate 612 conveys the following liquid crystal glass plate 501, and drawing 5 (B) shows the condition of having laid on the pin P1 of the pressure-from-below device 300 - P4. At this time, in advance, migration control is carried out and the buffer style 400 is evacuated upwards. Next, as shown in drawing 5 (C), downward control of the table 301 of the pressure-from-below device 300 is carried out, and the condition that the liquid crystal glass plate 501 currently laid on a pin P1 - P4 was laid on the pallet is shown. After this, the liquid crystal glass plate 501 is arranged by migration of a slider 100 in an inspection location.

[0019] In the above-mentioned example, although especially the justification (posture adjustment of liquid crystal glass plate 500) means of a pallet 111 was not described, in order to make contact of a probe exact in an inspection location, the posture adjustment device is arranged with actual equipment. This attitude control means is arranged by the lower part (direction shown by the arrow head W of drawing 1) of an inspection location.

[0020] Drawing 6 is the posture adjustment device 900 arranged at the lower part of an inspection location. 900 is the rectangular base. This base 900 is arranged in the predetermined location of the probe bottom. The rectangular pallet 800 is laid in the center of a top face of the base 900. the area of

this pallet 800 is small and superficially more nearly movable than that of the base 900 in a base top -- slide bearing **** is laid in support means, such as the adsorption section of a vacuum adsorber, so that it may be free.
[0021] Plungers 901 and 901 are attached in the top face by the side of one side of X shaft orientations of the base 900, and it is constituted so that the edge of a pallet 800 may be elastically pressed down in the arrow-head X1 direction. If the adjusting screw 904 is ****(ed) by the bearing 903 on the top face by the side of the side of another side of the base 900 which countered these plungers 901 and 901 and this adjusting screw 904 is rotated in the predetermined direction, a pallet 800 can be driven for the edge of a pallet 800 to push and X 2-way. Moreover, plungers 902 and 902 are attached in the top face by the side of one side of Z shaft orientations of the base 900, and it is constituted so that the edge of a pallet 800 may be elastically pressed down in the arrow-head Z1 direction. If adjusting screws 905 and 906 are ****(ed) by bearings 907 and 908 on the top face by the side of the side of another side of the base 800 which countered these plungers 902 and 902, respectively and these adjusting screws 905 and 906 are rotated in the predetermined direction, a pallet 800 can be driven for the edge of a pallet 800 to push and Z 2-way. The rotation of adjusting screws 904, 905, and 906 can adjust adjustment of the rotation (theta) direction. Moreover, the pins P11-P14 for supporting a liquid crystal glass plate (LCD) are stood up and formed in the top face of a pallet 800.
[0022] The base 900 can lift the liquid crystal glass plate which surfaces the base 900 up and is in an inspection location by pins P11-P14 like a previous pressure-from-below device. In this case, positioning to contact of LCD is performed by the above-mentioned adjustment device by justifying a pallet 800.
[0023] In case a pallet 800 is positioned (that is, positioning of LCD), the expansion image pick-up of the circuit pattern of LCD is carried out with a video camera, and it compares on the reference pattern memorized in memory, and a screen, and has become the structure which adjusts the location of a pallet 800 so that a circuit pattern and a reference pattern may be in agreement.
[0024] In addition, adsorption immobilization of the pallet 800 is carried out by the vacuum adsorption means after justification to the base 900. That is, 911 and 912 are the adsorption sections and these adsorption sections 911 and 912 are connected to the aspirator through splices 913 and 914, respectively. As a posture adjustment device 900, it is not limited to an above-mentioned method and an above-mentioned configuration, and various kinds of examples are possible. Moreover, it is not limited to the example described above also as other devices, and various kinds of deformation implementation is possible, and inspected components are not limited to a liquid crystal device, either.
[0025]
[Effect of the Invention] As explained above, workability can be improved markedly, compaction and a miniaturization of working hours are realized, and, as for this invention, control can also offer easy equipment and an easy approach.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention relates to the electronic board test equipment which carries out suitable [of the electronic boards, such as a liquid crystal plate and an electronic part article substrate,] to inspecting with sufficient working efficiency.
[0002]

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] For example, after manufacturing a liquid crystal plate, the contact probe is inspected in contact with the terminal electrode. Conventional test equipment for this incorporated and carried out the liquid crystal plate which inspection ended, after conveying and installing the liquid crystal plate of non-checking in the inspection location, then conducting inspection predetermined in this inspection location and inspection finishing, next the process of conveying and installing the new liquid crystal plate for inspected in an inspection location is taken. Although this process is performed by the robot, the whole working hours are long and much more improvement is desired. Moreover, control of a robot is complicated in order to take a complicated process also about a robot.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, workability can be improved markedly, compaction and a miniaturization of working hours are realized, and, as for this invention, control can also offer easy equipment and an easy approach.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] If it is in conventional electronic board test equipment as described above, improvement in the workability, compaction of working hours, the simplification of control and a miniaturization, and small tooth-space-ization are desired. Then, this invention realizes a miniaturization and also aims compaction and control of working hours at offering easy electronic board test equipment while it can improve workability markedly.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] This invention is characterized by providing the following. The slider which sets spacing in the slide direction and has the 1st and 2nd carried section A slider drive means to locate said 1st carried section in said inspection location where said 1st carried section of said slider is located in the 1st supply location, it located said 2nd carried section in the inspection location and said 2nd carried section is located in the 2nd supply location Test equipment which arranged the inspection probe in the upper part of said inspection location The exchange style which exchanges the electronic board [finishing / inspection] carried in said 1st [the] which moved to said 1st and 2nd supply locations, and said 2nd carried section for the electronic board to be inspected from now on
[0005] By this invention, said exchange style is arranged by the lower part of the said 1st and 2nd supply location further again, respectively. The 1st of said slider, the 1st which the electronic board carried in the 2nd carried section can be thrust [1st] up up, and can surface it, and the 2nd pressure-from-below device, The 1st and the 2nd buffer style which are arranged in the upper part of the said 1st and 2nd supply location, respectively, and can receive the electronic board which has surfaced according to the said 1st and 2nd pressure-from-below device in each location, The electronic board held by the said 1st and 2nd buffer style is taken out, and it has said 1st [the] which became empty, and the supply device in which a new electronic board is supplied to the 2nd carried section.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing showing the appearance in one example of this invention.
[Drawing 2] Drawing shown in order to explain a motion of the slider of drawing 1 , and actuation of a pressure-from-below device.
[Drawing 3] The explanatory view of the pressure-from-below device of drawing 1 , and a buffer style.
[Drawing 4] Drawing shown in order to explain actuation of the supply device of drawing 1 .
[Drawing 5] Drawing shown in order to explain exchange of a liquid crystal glass substrate.
[Drawing 6] Drawing showing the attitude control device in an inspection location.
[Description of Notations]
100 [-- A buffer style, 600 / -- A supply device, 900 / -- Attitude control device.] -- A slider, 200 -- A slider drive, 300 -- A pressure-from-below device, 400

[Translation done.]

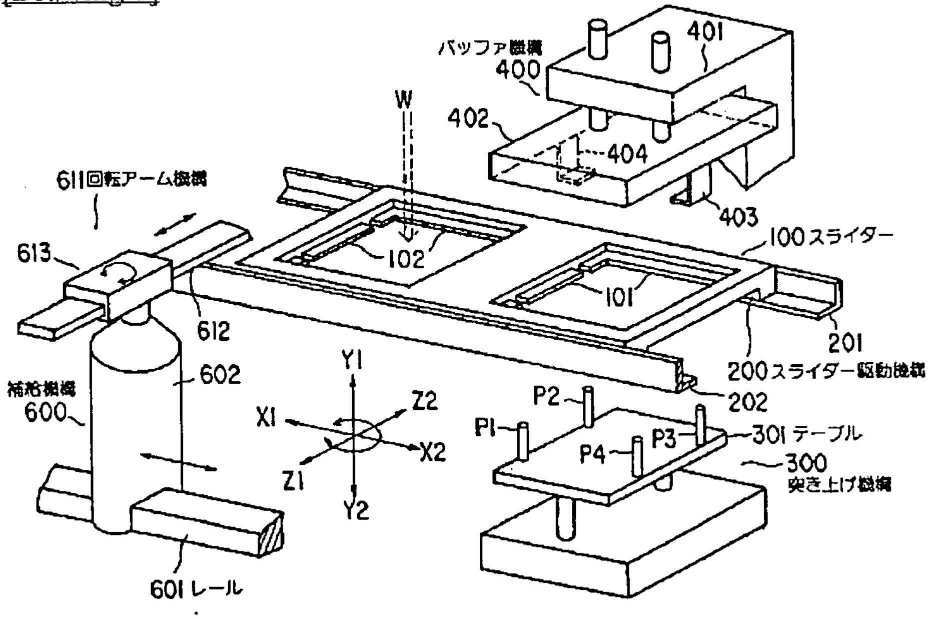
* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

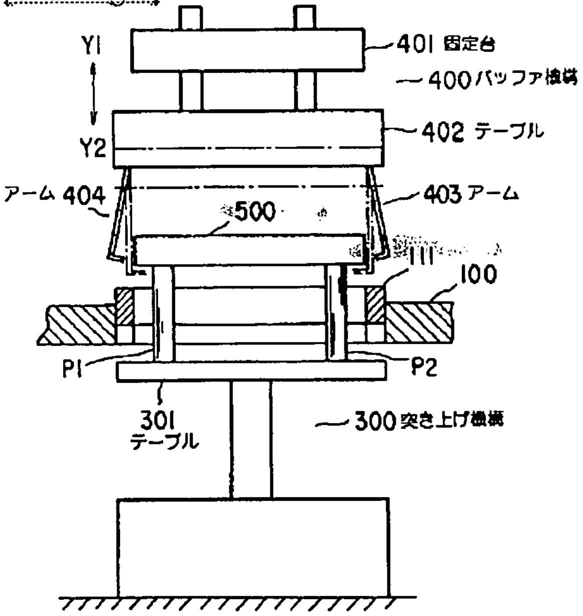
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

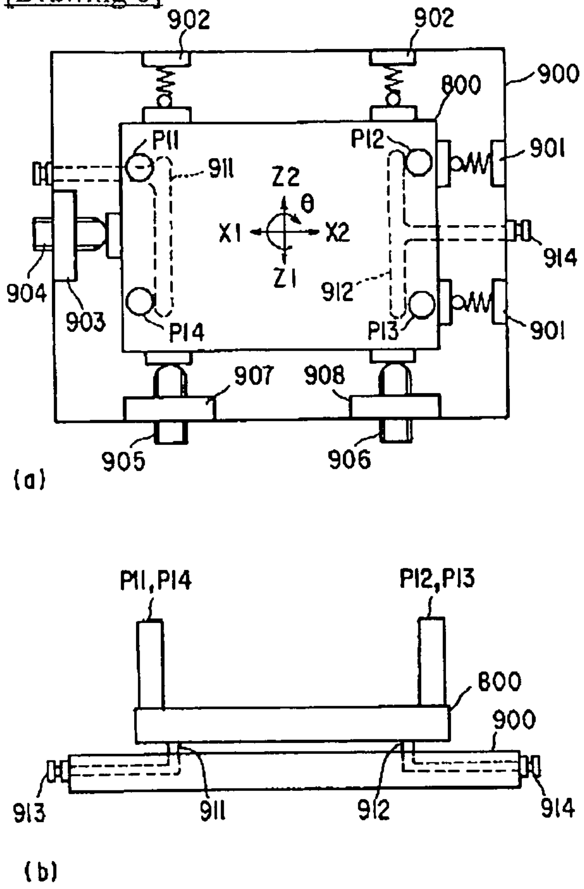
[Drawing 1]



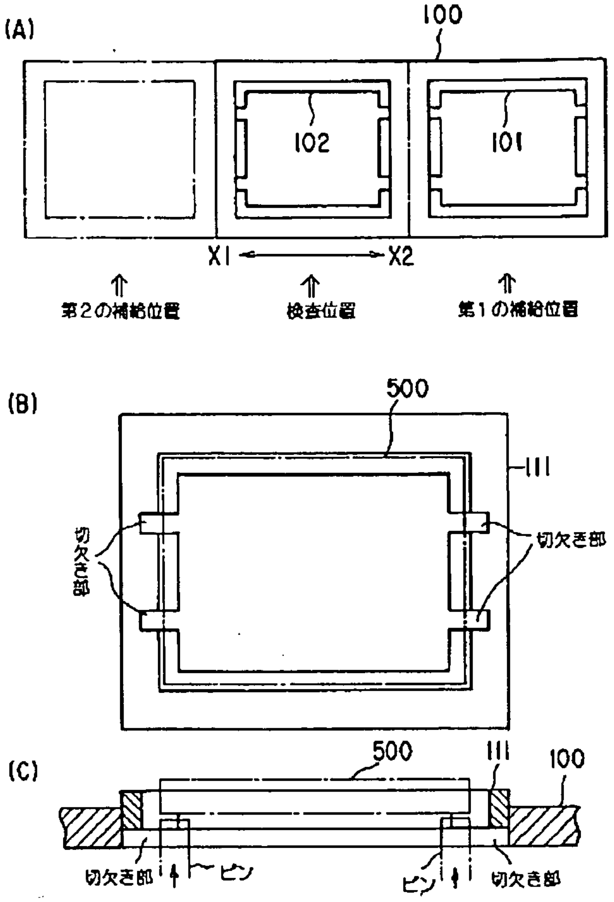
[Drawing 3]



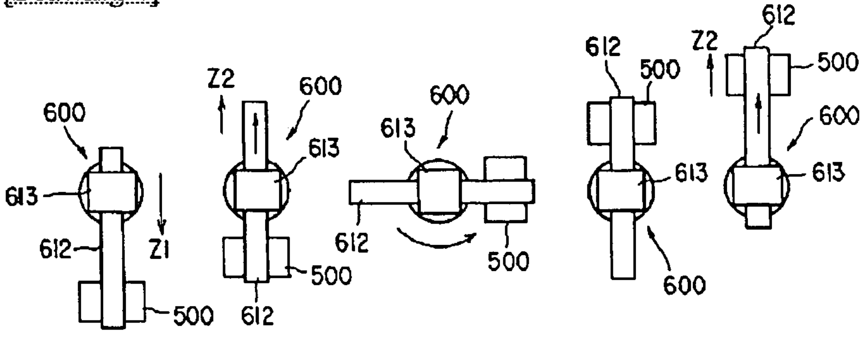
[Drawing 6]



[Drawing 2]

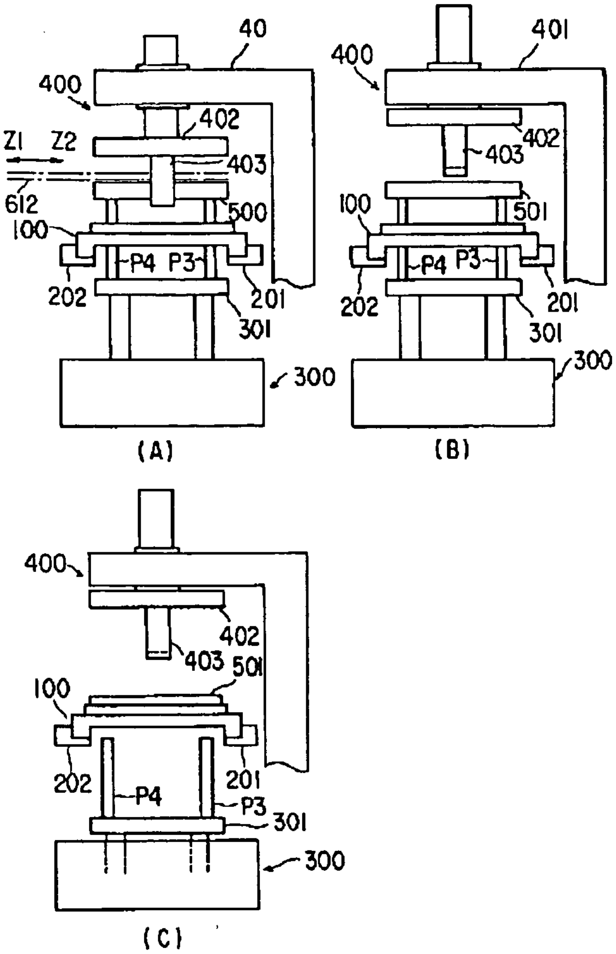


[Drawing 4]



(a) (b) (c) (d) (e)

[Drawing 5]



[Translation done.]